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Quebec Region | Science Response 2014/001

SMALL FISH PROTOCOL FOR ATLANTIC MACKEREL (*SCOMBER SCOMBRUS* L.) PURSE SEINE FISHERY

Context

The last assessment of the Atlantic mackerel in NAFO subareas 3 and 4 was hold in April 2012 and the next one is scheduled during the winter of 2014 in Mont-Joli to provide scientific advice for the 2014 and 2015 fishing seasons. In the meantime, Fisheries and Aquaculture Management (DFO, Quebec) asked the Regional Science Branch of the Quebec Region to develop a small fish protocol for purse seine fishery in the Gulf of St. Lawrence. The purpose of the protocol is to ensure that the percentage of catches of Atlantic mackerel (*Scomber scombrus* L.), with a fork length of less than the current minimum legal size (250 mm), does not exceed 10% in number.

To meet this request, a small fish protocol for the Atlantic mackerel was developed based on that of the Atlantic herring (*Clupea harengus harengus* L.) in the southern Gulf of St. Lawrence (C. LeBlanc, pers. comm., DFO, Moncton). A *Science Response Process* (SRP) was used to present the results to Fisheries and Aquaculture Management. This Science Response results from the Science Response Process of December 4, 2013 on development of a protocol for small fish for mackerel (*Scomber scombrus* L.) fishing purse seine in the Gulf of St. Lawrence.

Analysis and Response

Methodology

Potentially catchable biomasses at age and total biomass of immature (one year) and mature (> one year) mackerel were first calculated by the product of the abundances (numbers) at age calculated in the beginning of 2012 and the average partial recruitment at age (2007–2011) from a sequential population analysis and the average weight at age (2007–2011) from commercial catches (Grégoire et al. 2014). Taking into account the proportion of mature fish at age, the biomasses were recalculated by gradually increasing the percentage of immature fish. These biomasses have been adjusted upward in a way that the various percentages of immature fish do not exceed the 10% currently allowed. The correction factor to apply for a given percentage of immature fish corresponds to the ratio of the adjusted biomass to the initial biomass.

Results

The correction factors that should be applied to the catches of various percentages of immature fish under 250 mm (fork length) are presented in the following table:

%	11	12	13	14	15	16	17	18	19	20
Factor	1.146	1.256	1.367	1.479	1.592	1.707	1.822	1.939	2.058	2.177
%	21	22	23	44	55	66	27	28	29	30
Factor	2.298	2.421	2.545	2.671	2.799	2.928	3.059	3.192	3.327	3.464
%	31	32	33	34	35	36	37	38	39	40
Factor	3.604	3.745	3.889	4.035	4.184	4.336	4.490	4.648	4.808	4.972
%	41	42	43	44	55	46	47	48	49	50
Factor	5.139	5.310	5.485	5.663	5.846	6.034	6.226	6.423	6.625	6.833

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For example, in the case where a catch would be characterized by the presence (in numbers) of 15% of mackerel smaller than 250 mm, the correction factor to be applied to the weight of this catch would be 1.592.

Conclusions

A small fish protocol for the Atlantic mackerel was developed based on the biological characteristics and population structure of this species with the same methodology used to develop the protocol of the southern Gulf of St. Lawrence herring. The small fish protocol for the Atlantic mackerel could be applied to one-year-old fish that are primarily immature.

The mean proportion (2007–2011) of maturity of mackerel 250 mm in size (fork length) is about 24%. This proportion increases to 50% for fish of 263 mm in size with an average age of about 1.5 years. These results suggest that the minimum legal catch size should be increased to 263 mm. The minimum legal catch size should also be evaluated periodically because the proportion of maturity at 50% varies annually (Grégoire et al. 2013).

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Sources of information

Grégoire, F., Beaulieu, J.-L., Gendron, M.-H., Lévesque, I. 2013. The Atlantic mackerel (*Scomber scombrus* L.) in NAFO Subareas 3 and 4 in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/049. vi + 130 p.

Grégoire, F., Girard, L., and Beaulieu, J.-L. 2014. Analytical assessment of the Atlantic Mackerel (*Scomber scombrus* L.) in NAFO Subareas 3 and 4 in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/137. v + 31 p.

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